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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : AHLGREN et al

Group Art Unit: 1773

Serial No : 08/996,367

Examiner: D.L. Tarazano, PhD.

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For : HEAT SHRINKABLE FILMS CONTAINING SINGLE SITE CATALYZED
COPOLYMERS

APPEAL BRIEF UNDER 37 C.F.R. 1.192

Commissioner of Patents
Washington, D.C. 20231

Sir:

This Appeal Brief under 37 C.F.R. 1.192 is submitted in further to the Notice of Appeal filed 6 February 2002 (received in the Mail Room on 7 March 2002), the period for submission of the brief on appeal being extended three months, i.e., through August 7, 2002, by the concurrently-filed petition for a three-month extension of time. The Commissioner is authorized to charge Deposit Account 07-1765 should any further amount be deemed to be due. Appellants respectfully request reversal of the rejection, in view of the arguments presented below.

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REAL PARTY IN INTEREST

The real party in interest in this patent application is Cryovac, Inc., the assignee of a 100% interest in this application.

RELATED APPEALS AND INTERFERENCES

There is no other currently-pending appeal which is related to the instant appeal, i.e., there is no appeal pending of the claims of a related application, such as a continuation or divisional application.

THE STATUS OF THE CLAIMS

The claims on appeal are Claims 1-8, 10-24, 26-43, 46-56, and 61-64. Claims 9, 25, 44, 45, 57-60, and 65-72 stand canceled. A copy of the claims presently on appeal appears in the Appendix, Pages 38-48.

STATUS OF AMENDMENTS

The Amendment under 37 CFR 1.116 filed concurrently with the filing of the Notice of Appeal has been entered. A second Amendment under 37 CFR 1.116 is being filed concurrently with this Brief.

SUMMARY OF THE INVENTION

Appellants' invention is directed to a heat-shrinkable film comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from three to then carbon atoms and a density of at least 0.902 g/cc. [Page 9 lines 21-25; Page 32 lines 24-28; Example 2, page 16] The heat-shrinkable film has been extruded and cooled to the solid state by cascading water, and is thereafter heated to its softening temperature and stretched in the machine an transverse directions followed by being quenched, so that the film will return to its unstretched dimensions when heated. [Page 10 lines 15-31.] The film can be a multilayer film, with the homogeneous linear copolymer present in one or more outer layers or in an inner layer. The invention also pertains to particular multilayer films including a film having outer layers comprising polypropylene with an inner layer comprising the linear homogeneous copolymer. [Page 17 line 25 through Page 18 line 4.] Another particular multilayer film comprises a seal layer, an inner layer comprising the homogeneous linear copolymer, and a barrier layer. [Page 21 lines 4-18.] Another multilayer film has a seal layer and a barrier layer, with the seal layer containing the homogeneous linear copolymer. [Page 23, lines 18-28.] Yet another multilayer film has at least one layer containing the homogeneous linear copolymer, with at least one layer of the film being crosslinked. [Page 25 line 17 through Page 26, line 2.] Another multilayer film has outer layers each comprising the homogeneous linear copolymer, with a core layer between the outer layers. [Page 32 lines 11-22.] Another film is a seamless tubing comprising the homogeneous linear copolymer. [Page 30 lines 13-28.]

The invention also pertains to a process for making a heat-shrinkable film, comprising extruding a film containing a homogeneous linear single site catalyzed copolymer, cooling the film with cascading water, reheating the film to a softening temperature of the homogeneous linear single site catalyzed copolymer, stretching the film, and quenching the film while maintaining its stretched dimensions. [Page 10 lines 15-31.]

ISSUES

The issues on appeal are as follows:

- (I) WHETHER CLAIMS 1-5, 8, 13-15, 36, 41, 42, 61, and 63 ARE ANTICIPATED BY US PATENT NO. 5,272, 016, TO RALPH
- (II) WHETHER CLAIMS 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 ARE OBVIOUS OVER RALPH
- (III) WHETHER CLAIMS 43 AND 46-55 ARE OBVIOUS OVER RALPH IN VIEW OF APPLICANTS' ADMISSIONS ON PAGE 10, PARAGRAPH 3
- (IV) WHETHER CLAIMS 1, 2, 3, 5, 6, 8, 10-13, 36, 42, 43, 46-49, 53, 56, AND 61-64 ARE OBVIOUS OVER U.S. PATENT NO. 4,551,380, TO SCHOENBERG, IN VIEW OF SCHUT "ENTER A NEW GENERATIONS OF POLYOLEFINS" AND VAN DER SANDEN "EXACT LINEAR POLYMERS OF ENHANCED SEALING PERFORMANCE" AND APPLICANTS' ADMISSIONS ON PAGES 10+
- (V) WHETHER CLAIMS 1, 2, 12, 13, 18-24, 26-41, AND 56 ARE OBVIOUS OVER U.S. PATENT NO. 5,055,328, TO EVERT, IN VIEW OF SCHUT "ENTER A NEW GENERATIONS OF POLYOLEFINS" AND VAN DER SANDEN "EXACT LINEAR POLYMERS OF ENHANCED SEALING PERFORMANCE"
- (VI) WHETHER CLAIMS 1, 2, 12-15, 18-22, 23, 24, 26-31, AND 33-41 ARE OBVIOUS OVER U.S. PATENT NO. 4,457,960, TO NEWSOME, IN VIEW OF SCHUT "ENTER A NEW GENERATIONS OF POLYOLEFINS" AND VAN DER SANDEN "EXACT LINEAR POLYMERS OF ENHANCED SEALING PERFORMANCE"
- (VII) WHETHER CLAIMS 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, AND 56 ARE OBVIOUS OVER U.S. PATENT NO. 5,403,448, TO WILHOIT
- (VIII) WHETHER CLAIMS 1, 2, 6-8, 10, 11, 15-17, 42, AND 56 ARE OBVIOUS OVER U.S. PATENT NO. 4,532,189, TO MUELLER, IN VIEW OF SCHUT "ENTER A NEW GENERATIONS OF POLYOLEFINS" AND VAN DER SANDEN "EXACT LINEAR POLYMERS OF ENHANCED SEALING PERFORMANCE"

THE GROUPING OF THE CLAIMS

For the purpose of this appeal only, the following claims stand or fall together:

- (I) with respect to novelty over RALPH, Claims 1-5, 8, 13-15, 36, 41, 42, 61, and 63 stand or fall together;
- (II) with respect to obviousness over RALPH, Claim 7 stand or falls alone, Claims 10 and 11 stand or fall together, Claims 15 and 62 stand or fall together, and Claims 1-5, 8, 12-14, 36, 42, and 56, 61, and 63 stand or fall together;
- (III) with respect to obviousness over RALPH in view of Appellants admissions, Claims 43 and 46-55 stand or fall together;
- (IV) with respect to obviousness over SCHOENBERG in view of SCHUT and Van der SANDEN et al and Appellants' admissions on Pages 10+, Claims 1, 2, 3, 5, 6, 8, 10-13, 36, 42, 43, 46-49, 53, 56, and 61-64 stand or fall together;
- (V) with respect to obviousness over EVERT in view of SCHUT and Van der SANDEN et al, Claims 1, 2, 12, 13, 18-24, 26-41, and 56 stand or fall together;
- (V) with respect to obviousness over NEWSOME in view of SCHUT and Van der SANDEN et al, Claims 1, 2, 12-15, 18-22, 23, 24, 26-31, AND 33-41 stand or fall together;
- (VII) with respect to obviousness over WILHOIT, Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 stand or fall together;
- (VIII) with respect to obviousness over MUELLER in view of SCHUT and Van der SANDEN et al, Claims 1, 2, 6-8, 10, 11, 15-17, 42, and 56 stand or fall together.

More particularly, one or more separate arguments are asserted for each of the above groupings of claims with respect to one or more of the issues presented below.

Appellants reserve the right to later assert still further and more specific arguments if a continuation application is filed, in litigation of a patent issuing from the instant application, etc.

THE ARGUMENTS

(I) CLAIMS 1-5, 8, 13-15, 36, 41, 42, 61, and 63 ARE NOVEL OVER RALPH

In Paragraph 5 of the 7 September final Office Action, Claims 1-5, 8, 13-15, 36, 41, 42, 61, and 63 are rejected under 35 USC 102(e) as anticipated by U.S. Patent No. 5,272,016, to Ralph ("RALPH"). The Office Action states that RALPH teaches shrinkable 3-layer films having core and surface layers comprising a blend of VLDPE, a plastomer, and a homogeneous ethylene/butene copolymer having a density of 0.900 g/cc (i.e., EXACT 3010C). The Office Action states that the EXACT 3010C copolymer corresponds to Applicants' recited density of 0.902 g/cc, and that Applicants' recited value of "0.902" falls within "about 0.900 g/cc" disclosed in RALPH, as there is only a 0.2% difference. The Office Action also states that the recitation of the film as being cooled by cascading water is a process limitation with nothing on the record to indicate that the product of this process is in any way different from a film made in any other way.

In response, Appellants contend that Claims 1-5, 8, 13-15, 36, 41, 42, 61, and 63 are not anticipated by RALPH. Appellants point out that each of the rejected claims recites a density of at least 0.902 g/cc. This language covers a density of 0.902 g/cc and greater, and does not read on the disclosure in RALPH of Exact 3010C, which RALPH discloses as having a density of "about 0.900 g/cc". See Claims 27 and 29 of RALPH, more particularly, Column 26 lines 38 and 51 of RALPH.

The Examiner has cited Lolene Corporation et al v. Motor City Metal Treating, Inc., 169 USPQ77 (CCPA 1971), stating that a range of 46-50% was held to infringe a range of "about 25 to 40%," and Conopco Inc v. May Department Stores Co., 32 USPQ2d 1225, stating that it was unreasonable to interpret the word "about" as encompassing a four-fold

increase in a component. In response, Appellants contend that it is far more appropriate to look to Viskase v. American National Can Corporation, 59 USPQ2d 1823, in which the issue is remarkably similar to the instant case. In Viskase, the trial judge held that the phrase “below about 0.91 g/cc”, recited with respect to the density of an ethylene/alpha-olefin copolymer, encompassed such polymers having a density up to 0.914 g/cc, and the CAFC agreed that rounding 0.91 up to 0.914 is “standard scientific convention *when a number has not been carried to the next mathematically significant figure.*” [Emphasis Added.] See the sentence spanning pages 1825-1826, and the first full sentence on 1826. Ultimately, the CAFC disagreed with the infringement conclusion of the district judge, but only because the patentee had argued “below about 0.910 g/cc” to overcome a reference, thereby restricting the scope of the claim to a maximum density of 0.910 g/cc.

The opinion of the CAFC in Viskase is inconsistent with the §102 rejection based on RALPH. It must be acknowledged that RALPH discloses EXACT 3010C as having a density of “about 0.900 g/cc”, not “about 0.90 g/cc”. The mathematically significant figure is the third decimal place, i.e., the last “0” in “0.900”. According to the CAFC in Viskase, a rounding of only plus or minus 0.0004 g/cc, at most 0.0005 g/cc, is all that is permitted under the phrase “about 0.900 g/cc”. Accordingly, RALPH discloses a maximum density of 0.9005 g/cc, which clearly is less than Appellants’ recited density of “at least 0.902 g/cc.” Accordingly, Appellants contend that the rejection under 35 USC 102(e) should be withdrawn, as RALPH does NOT anticipate any of Appellants’ claims.

In addition, Appellants note that each of their independent claims recites the homogeneous linear single site catalyzed copolymer as a copolymer of ethylene and an alpha-olefin having from six to ten carbon atoms (Claims 1, 42, and 43) or having from six

to eight carbon atoms (Claims 16, 18, 28, 35, and 36). The EXACT 3010C polymer in RALPH is a copolymer of ethylene and butene. This is another reasons RALPH does not anticipate any of Appellants' claims.

Finally, the Examiner has also stated that there is "...only a 0.2% difference" between the resin disclosed in RALPH and Appellants' claims. While Appellants provide comments below on why it would not have been obvious to modify the density of the EXACT 3010C resin of RALPH by increasing the density to at least 0.902 g/cc (see remarks under heading "(II)", below), Appellants point out that for the purpose of responding to the §102 rejection, this 0.2% difference is indeed a "difference" between RALPH and Appellants' invention.

***(II) CLAIMS 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 ARE
NONOBVIOUS OVER RALPH***

In Paragraph 6 of the 7 September final Office Action, Claims 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 are rejected under 35 USC 103(a) as unpatentable over RALPH. The Office Action refers to the description of RALPH set forth in Paragraph 5 of the Office Action, and further states that the EXACT polymer of RALPH is the same as Appellants' recited polymer, and that RALPH's teaching of "about 0.900 g/cc" is very close to the value Appellants recite in their claims, and that Applicants have not shown any criticality in this difference. The Office Action further states that because it contains the word "about", the phrase "about 0.900 g/cc" covers Appellants' recited value of "0.902 g/cc". As to Claim 7, which is directed to a blend of a homogeneous ethylene/alpha-olefin copolymer and a thermoplastic homopolymer, the final Office Action states that RALPH teaches a blend of the homogeneous copolymer with VLDPE, which, although it is a thermoplastic copolymer,

renders obvious a blend with a thermoplastic homopolymer, as long as the density requirements in RALPH are met. As to Claims 10 and 11, the Office Action states that although RALPH teaches a homogeneous ethylene/butene copolymer, it would have been obvious to have used a comonomer of hexene or octene. With regard to Claims 15 and 62, the Office Action states that the second surface layer can be considered an inner layer, in view of Appellants' structures in the examples.

In response, Appellants contend that for several reasons, Claims 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 are patentable over RALPH. First, Claims 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 recite a density of "at least 0.902 g/cc", which does not overlap with the "about 0.900 g/cc" disclosed by RALPH, for at least all the reasons advanced above. Appellants further point out that while the Office Action states on Page 5 lines 5-6 that Appellants' claims recite the density of the homogeneous copolymer using the word "about", this term was deleted in the amendment filed November 18, 1999.

Moreover, Appellants contend that it would not have been obvious to increase the density of the EXACT 3010C 0.900 g/cc homogeneous copolymer disclosed in RALPH to result in a polymer having a density within the range of at least 0.902 g/cc, because to do so would *go against the desired lowering of the seal initiation temperature disclosed in RALPH*. See TABLE N of RALPH at Column 23, and particularly the discussion thereof at Column 23 lines 20-29, at which RALPH states that the seal initiation temperature may be substantially lowered by the addition of EXACT 3010C, with the net effect of desirably broadening the heat sealing range. Since, for a single site catalyzed resin, the melt point increases with increasing density, raising the density of EXACT 3010C in RALPH would go against the objective of RALPH of lowering the seal initiation temperature and also go

against the desired broadening of the heat sealing range, i.e., increasing the density would narrow the seal temperature range. If anything, it would have been obvious to *lower* the density of the EXACT 3010C to a value below 0.900 g/cc, not to elevate the density to at least 0.902 g/cc, as recited in each of Appellants' independent claims.

Appellants direct attention to the further fact that independent Claims 1, 42, and 43 each recite the comonomer as having six to ten carbon atoms, and that independent Claims 16, 18, 28, 35, and 36 each recite six to eight carbon atoms. In other words, no claim on appeal is directed to a homogeneous copolymer of ethylene and a comonomer having four carbon atoms, i.e., ethylene/butene copolymer. EXACT 3010C, disclosed in RALPH, is an ethylene/butene copolymer. The final Office Action fails to acknowledge this further difference between RALPH and Appellants' claims, and fails to provide any reason as to why it would have been obvious to increase the comonomer from four carbons to six to ten carbons or six to eight carbons. This is a further reason that the final Office Action fails to make out a prima facie case of obviousness of Claims 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 as obvious over RALPH.

Appellants disagree with the various statements pertaining to Claims 10 and 11, i.e., regarding VLDPE as a copolymer of ethylene and butene, hexene, or octene, followed by referring to the EXACT resin as an ethylene/butene copolymer, followed by the conclusion that it would have been obvious to have used a homogeneous copolymer of ethylene with hexene or octene comonomers. The EXACT 3010C copolymer disclosed in RALPH is not identified as VLDPE (or the "plastomer" of RALPH, for that matter). Rather, the EXACT 3010C resin is simply an "ethylene alpha olefin copolymer" (Column 22, line 54, and Column 23 line 22) or a "second ethylene alpha olefin" (Claim 27). which does not fall into

the class of being a VLDPE. Note the Table in Column 5 of RALPH, which states that a VLDPE has a molecular weight distribution (Mw/Mn) of “above about 3”. Applicants note that homogeneous copolymers, such as EXACT 3010C, are well known to have a molecular weight distribution *below, and not including*, 3. Appellants direct attention to Claim 27 of RALPH, which states that the ethylene/butene copolymer (referred to as EXACT 3010C in dependent Claim 29) has a Mw/Mn of “about 2”. Further, in Table N, at Column 23 of RALPH, the EXACT 3010C resin is listed separately from “VLDPE”, and separately from “plastomer”. The fair conclusion is that RALPH discloses EXACT 3010C not as a VLDPE or a plastomer, but as a third component (i.e., “second ethylene alpha olefin”). The statements in the final Office Action regarding Claims 10 and 11 assume that homogeneous copolymers may be equated with VLDPEs. As pointed out above, RALPH discloses homogeneous copolymers as being distinct from VLDPE.¹ Because RALPH discloses EXACT 3010C as being distinct from VLDPE, one of skill in the art would not apply RALPH’s statements regarding the use of various comonomers in VLDPEs to some third component which is EXACT 3010C. Thus, the rejections of Claims 10 and 11 should be withdrawn as there is no teaching or suggestion in RALPH to modify the comonomer of the EXACT 3010C.

As to the statement in the Office Action regarding Claims 15 and 62, i.e., that a second surface layer can be considered to be an inner layer, Appellants disagree. An inner layer is a core layer, not an outer film layer. As a core layer, the inner layer is not affected by the seal initiation temperature improvement in the outer layers of the film of RALPH.

¹ Applicants acknowledge that the Certificate of Correction in RALPH states that Exact copolymer is a VLDPE. However, Applicants note that this Certificate of Correction is not prior art with respect to Applicants’ filing date. Thus, the only disclosure in RALPH which can be relied upon is the specification of RALPH as filed, which contains no teaching or suggestion that EXACT copolymer is a VLDPE.

Table N in RALPH has the EXACT copolymer in a three-component blend in the outer layers of the film. In contrast, Claims 15 and 62 recite the homogeneous copolymer in an inner film layer. There is no teaching or suggestion in RALPH to provide an inner film layer containing the EXACT 3010C copolymer.

In Paragraph 18 of the final Office Action, the Examiner refers to RALPH when stating that comonomers to be used in homogeneous ethylene/alpha-olefin copolymer and linear low density polyethylene (LLDPE) are both used to disrupt the crystal lattice and thereby lower the density of the polymer, and that since the comonomer in LLDPE and homogeneous ethylene copolymers both provide the same function, it would have been obvious to one of ordinary skill in the art to have used comonomers other than butene.

In response to these remarks, Appellants contend that for at least two reasons, claims directed to comonomers having at least six carbon atoms are nonobvious over RALPH. First, there is no teaching or suggestion in RALPH to change the comonomer in the EXACT 3010C from butene to some higher comonomer. Moreover, RALPH does not teach or suggest a selection of comonomer for homogeneous copolymers as being similar to comonomer selection for heterogeneous copolymers such as LLDPE and VLDPE. At Column 5, lines 1-16, RALPH states that TAFMER™ is “ethylene-butene” copolymer. Thus, all single site copolymers disclosed in RALPH are ethylene/butene copolymers.² Without a teaching or suggestion to use the comonomers used in LLDPE or VLDPE, the obviousness rejection based on RALPH impermissibly relies upon hindsight, i.e., relies upon Appellants’ teachings of higher comonomers in homogeneous copolymers.

Second, even assuming there is some teaching or suggestion (which there is not), Appellants conducted experiments which revealed that for heat-shrinkable films, impact

strength is significantly increased by selecting homogeneous ethylene/hexene copolymer and/or homogeneous ethylene/octene copolymer, rather than homogeneous ethylene/butene copolymer. There is no teaching or suggestion in RALPH that higher comonomers can be used to provide a heat-shrinkable film containing homogeneous ethylene copolymer having Appellants disclosed increased impact strength.

Moreover, contrary to the statements in the Office Action that the RALPH discloses the EXACT 3010C resin as a VLDPE, Appellants note that this disclosure in RALPH did not appear until the addition of *new matter* in the Certificate of Correction, which was not filed until a date after Appellants' filing date, and therefore cannot be used as prior art against Appellants' claims. The remainder of RALPH indicates that the EXACT 3010C is neither a VLDPE nor a plastomer, as explained in detail above. As a result, Appellants contend that this is yet another reason that Claims 1-5, 7, 8, 10-15, 36, 42, 56, and 61-63 are patentable over RALPH.

***(III) CLAIMS 43 AND 46-55 ARE PATENTABLE OVER RALPH
IN VIEW OF APPLICANTS' ADMISSIONS
ON PAGE 10, PARAGRAPH 3***

Paragraph 7 of the 7 September final Office Action states that Claims 43-55 are rejected under 35 USC 103(a) as obvious over RALPH in view of admissions at Page 10 Paragraph 3 of Applicants' specification. The Office Action states that RALPH is relied upon as discussed in the rejections addressed above (under headings I and II), but that RALPH is silent as to processing conditions such as cascading water. The Office Action further states that Page 10 of Applicants' specification admits that well known orientation conditions can be used to orient Applicants' recited films, including cascading water. The

² Column 5, line 14 permits terpolymers of ethylene and butene.
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Office Action concludes that it would have been obvious to have used conventional orientation techniques in order to produce heat-shrinkable films in accordance with RALPH. Regarding Claims 53 and 54, the Office Action states that the films can be irradiated before or after biaxial orientation. Regarding Claims 50-52, the Office Action states that optimizing the orientation temperature is within the level of ordinary skill in the art, that the films of RALPH shrink at 90°C and that therefore the orientation temperature would have taken place at 90°C.

In response, Appellants contend that Claims 43 and 46-55 are patentable over RALPH in view of Appellants' admissions on Page 10, paragraph 3. At the outset, Appellants note that Claims 43 and 46-55 each require that the homogeneous linear ethylene copolymer have a density of at least 0.902 g/cc, and that RALPH does not teach or suggest such a density, and does not motivate increasing the density, as discussed above. Appellants further note that Claims 43 and 46-55 recite the homogeneous linear ethylene copolymer be a copolymer of ethylene and an alpha-olefin having from six to ten carbon atoms, and that RALPH does not teach or suggest changing the EXACT 3010C ethylene/butene copolymer to a copolymer of ethylene and a comonomer having from six to ten carbon atoms.

In addition, Appellants note that orientation temperatures are not taught or suggested by RALPH. Moreover, Appellants contend that the temperature at which orientation is to occur requires undue experimentation because homogeneous ethylene/alpha-olefin copolymers have a different temperature profile from heterogeneous resins of the prior art. When orienting films containing homogeneous copolymer,

orientation conditions must be determined by trial and error in order to obtain the desired shrink and impact strength results.

The practice of establishing the orientation temperature for single site catalyzed, homogeneous resins was not obvious or known to those of ordinary skill at the time of the instant invention. The orientation temperature greatly affects the film properties and is established by trial and error. If the orientation temperature (e.g., hotbath temperature) is too low, stresses required to stretch the film by trapped bubble or tenter frame are too great and the film tears or the orientation bubble breaks. If, on the other hand, the temperature is too high, the material becomes too soft and tends to over-stretch in some areas resulting in uneven film thickness. At the time of Appellants' invention, the selection of the correct orientation temperature was especially difficult when dealing with the new and different linear homogeneous resins. This is because homogeneous resins have a single melting point, unlike heterogeneous resins, which have multiple melting points. Whereas heterogeneous resins may be oriented over a range of temperatures which are often about 20 degrees below the major melting point of the more crystalline portions, Appellants have discovered through significant and extensive experimentation that homogeneous resins are very sensitive to orientation temperature and must be stretched at a temperature just slightly below the melting point. Under certain circumstances, even 1°F can dramatically affect whether the orientation succeeds or fails. This sensitivity was not known to those of ordinary skill at the time of the invention. The orientation temperature had to be determined through experimentation. Evidence of property differences

resulting from change in orientation temperature may be seen in Table III (Page 22) and Table IV (Page 23) of Appellants' specification. More particularly, compare Appellants' Example 11 with Example 13, and compare Example 12 with Example 14. Raising the bath temperature from 195°F to 210°F reduced the shrink and impact value by a factor of about 2. This demonstrates the unpredictability, and the need for experimentation, in selecting the correct processing conditions of homogeneous resins. Based on the arguments set forth above, the rejection of Claims 43 and 46-55 should be withdrawn.

**The Various §103 Rejections Relying upon SCHUT
and Van der SANDEN as Secondary References**

- (IV) CLAIMS 1, 2, 3, 5, 6, 8, 10-13, 36, 42, 43, 46-49, 53, 56, AND 61-64
ARE PATENTABLE OVER SCHOENBERG,
IN VIEW OF SCHUT AND VAN DER SANDEN
AND APPLICANTS' ADMISSIONS ON PAGES 10+**
- (V) CLAIMS 1, 2, 12, 13, 18-24, 26-41, AND 56 ARE PATENTABLE OVER
EVERT, IN VIEW OF SCHUT AND VAN DER SANDEN**
- (VI) CLAIMS 1, 2, 12-15, 18-22, 23, 24, 26-31, AND 33-41
ARE PATENTABLE OVER NEWSOME
IN VIEW OF SCHUT AND VAN DER SANDEN**
- (VIII) CLAIMS 1, 2, 6-8, 10, 11, 15-17, 42, AND 56 ARE PATENTABLE
OVER MUELLER IN VIEW OF SCHUT AND VAN DER SANDEN**

In Paragraphs 8, 9, 10, and 12 of the 7 September final Office Action, various combinations of Claims 1-3 and 5-8, 10-24, 26-43, 46-49, 53, 56, and 61-64 are respectively rejected 35 USC 103(a) as unpatentable over the following four primary references:

- (1) U.S. Patent No. 4,551,380, to Schoenberg ("SCHOENBERG"),
- (2) U.S. Patent No. 5,055,328, to Evert et al ("EVERT et al"),
- (3) U.S. Patent No. 4,457, 960, to Newsome et al ("NEWSOME et al"), and
- (4) U.S. Patent No. 4,532,189, to Mueller et al ("MUELLER et al"),

each in view of the Schut “Enter a New Generation of Polyolefins” Nov. 1991 Plastics Technology (“SCHUT”) and Van der Sanden et al. “EXACT Linear Polymers of Enhanced Sealing Performance” ANTEC 1992 (“VAN der SANDEN et al”) as secondary reference documents. The rejection based on SCHOENBERG further relies upon Appellants’ admissions on Pages 10+ regarding conventional methods of film orientation. With respect to each of the primary references, the Office Action states that the primary reference discloses a multilayer heat shrinkable film comprising LLDPE in a blend with, for example, linear medium density polyethylene and/or ethylene/vinyl acetate copolymer and/or very low density polyethylene, with EVERT and NEWSOME also teaching the presence of barrier polymers, such as polyvinylidene chloride and ethylene/vinyl alcohol copolymer. The 7 September Office Action states that SCHOENBERG and EVERT teach orientation using a double bubble method. While the Office Action admits that none of the primary references discloses a homogeneous copolymer (i.e., copolymer produced using single site catalyst), the Office Action states that SCHUT teaches a new type of LLDPE copolymers made using single site catalysts. The Office Action states that SCHUT discloses single site catalyzed copolymers having a density of at least 0.90 g/cc, and further states that SCHUT teaches using these copolymers in multilayer films and blends exhibiting superior physical characteristics, such as lower seal initiation temperature, higher impact strength, and better clarity. The Office Action states that it would have been obvious to use the single site catalyzed copolymers in the heat shrinkable films of the primary references because SCHUT discloses the single site catalyzed copolymers as having far superior properties such as heat seal initiation temperature, higher dart impact strength, and better clarity. The Office Action refers to Van der SANDEN et al as teaching superior attributes of single site

catalyzed copolymers and states that such copolymers are a choice material in the production of heat sealable films.

In response, Appellants contend that Claims 1-3 and 5-8, 10-24, 26-43, 46-49, 53, 56, and 61-64 are patentable over each of the primary references (SCHOENBERG, EVERT et al, NEWSOME et al, and MUELLER et al) in view of SCHUT and Van der SANDEN. Applicants agree that each of the primary references teaches a multilayer heat-shrinkable film containing LLDPE, as well as blends of LLDPE and other polymers. However, the films disclosed by SCHUT and VAN der SANDEN et al are cast films or blown films, and as such are clearly not the heat shrinkable-film of Appellants' invention; they are not films which inherently have the shrink properties present in films which have been extruded and cooled to their solid state by cascading water, and thereafter heated to the softening temperature of the polymer and then stretched in the machine and transverse directions followed by being quenched, so that the film will return to its unstretched dimensions when heated. Moreover, neither SCHUT nor Van der SANDEN et al teach or suggest the use of homogeneous ethylene/alpha-olefin copolymers in such heat-shrinkable films.

The use of SCHUT and Van der SANDEN to modify SCHOENBERG, EVERT et al, NEWSOME et al, and MUELLER et al to result in a heat-shrinkable film comprising a linear homogeneous copolymer of ethylene and an alpha-olefin having six to ten carbon atoms is a hindsight reconstruction of Appellants' invention, using Appellants' specification as a guide. There is no teaching or suggestion in either SCHUT or Van der SANDEN et al to use the metallocene-catalyzed copolymers disclosed therein in the heat-shrinkable film of Appellants' invention. Rather, SCHUT discloses "coextruded cast films, wire/cable coatings, injection molded medical and automotive parts." SCHUT discloses cast and

blown films, not the heat-shrinkable film of Appellants' invention. Moreover, when specifically referring to blown films, SCHUT discloses on Page 19, Column 3 that "monolayer blown films grades aren't yet possible." With such a teaching of problems when the resins are used in blown films, it is not reasonable to conclude that there is even a *motivation to try* such resins for the preparation of the heat-shrinkable film of Appellants' invention.

Van der SANDEN et al is particularly directed to sealing performance (note the title of Van der SANDEN "Exact™ Linear Ethylene Polymers for Enhanced Sealing Performance"), and discloses the new linear single site catalyzed ethylene polymers as providing low seal initiation temperatures, low hexane extractables, and low film haze, as well as higher toughness and higher strength than LDPE or EVA, without any teaching or suggestion in the direction of making the heat-shrinkable film of Appellants' invention. Appellants further note that Van der SANDEN et al states that "Each converting method (film, extrusion coating, lamination) has its own processing requirements (melt strength, thermal stability, rheology) which must be satisfied to yield the economical production of the packaging structure." This last statement indicates that Van der SANDEN et al acknowledges that experiments must be conducted to see if a particular new EXACT polymer (which is a linear ethylene/alpha-olefin copolymer) is suitable for use in a particular process of making a particular packaging structure.

SCHUT teaches the use of the homogeneous copolymers in coextruded cast films, wire and cable coatings, injection molded medical and automotive parts, and blown films. However, the strength and clarity statements in SCHUT relate to injection molded products and blown films, rather than to the heat-shrinkable film of Appellants' invention. More

particularly, the only films referred to in SCHUT are blown and cast films, neither of which is a downward cast water quenched film, and neither of which is therefore the heat-shrinkable film of Appellants' invention. Although SCHUT states that it is likely that the new very narrow MWD resins will be used in layers and blends (i.e., in *cast* and *blown* films) because of their high price, SCHUT addresses non-economic concerns, i.e., technical concerns, in stating:

For now, the high shear and low melt strength of the new resins, caused by their very narrow MWD, means that optimized blow molding and monolayer blown film grades aren't yet possible, Exxon says. [SCHUT, at Page 17, Col 3]

Appellants have argued, in the Amendment filed 15 November 1999, the personal interview of 19 January 2000, and the personal interview of 10 October 2000, and the Amendment filed 23 October 2000, that the above-quoted statement in SCHUT is a teaching away from the use of the linear homogeneous resins for the making the heat-shrinkable film of Appellants' invention. The above-quoted statement acknowledges the low melt strength of the "very narrow MWD" (i.e., homogeneous) linear resins from Exxon. Those of skill in the art recognized, at Appellants' 13 November 1992 filing date, that downward casting was (and for that matter, still is) the dominant commercial method for making heat-shrinkable films, and that downward casting requires significantly greater melt strength than is required for the manufacture of a blown film. As such, based on the above-quoted statement from SCHUT, one of skill in the art would have considered these narrow MWD resins to be unsuitable for the commercial manufacture of such heat-shrinkable films. Appellants contend that this is a teaching away from the use of the narrow MWD resins in the making of a heat-shrinkable film using cascading water cooling. Thus, there is

no teaching or suggestion in SCHUT that would lead those of skill in the art to believe that the homogeneous Exxon copolymers disclosed therein are suitable for the making of such a heat-shrinkable film. Rather, taking SCHUT as a whole, one of ordinary skill would not have been motivated to combine SCHUT with any one or more of the primary references relied upon, and would have considered the polymer described in SCHUT not to be useful for making such a heat-shrinkable film, due to the nature of the typical downward cast commercial production process for making such a heat-shrinkable film, which requires more melt strength than for the SCHUT blown films.

The disclosure of improved impact strength in SCHUT is accompanied by a description including “coextruded cast films”, “3-mil film”, “1.2 mils”, and “monolayer blown film grades”. Each of these films is different from Appellants’ claimed heat-shrinkable film. The disclosure of higher Dart Impact and higher Tensile Impact for EXXPOL EXACT polymer in Table 1 of SCHUT appears to be for a cast or blown film, not Appellants’ heat-shrinkable film. The disclosure in Table 2 of SCHUT of a 107 in-lb impact strength for EXXPOL EXACT-101 is for an injection molded product, not a film. One of skill in the art would not have assumed that the impact strength of a blown or cast film, or an injection molded product, would translate to higher impact strength for Appellants’ claimed heat-shrinkable film.

In Paragraph 16 of the 7 September final Office Action, the Examiner states that Appellants’ arguments directed to the recitation that “the film is cooled by cascading water” does not set forth a patentable distinction because nothing in the record establishes any criticality to the method. In response, Applicants note that the record does in fact contain evidence of criticality of the cascading water process over SCHUT and Van der SANDEN

et al. SCHUT, in stating that the linear homogeneous copolymers lack melt strength for the making of blown films, is teaching those of skill in the art that the linear homogeneous copolymers lack the melt strength for downward casting in which the film is cooled by cascading water. This is not mere attorney argument, as the very reference document being applied against the claims, i.e., SCHUT, makes this point. Although Van der SANDEN et al differs from SCHUT in not specifically disclosing the low melt strength of the EXACT linear ethylene polymers, Van der SANDEN et al contains no teaching or suggestion to use EXACT copolymer to make Appellants' heat-shrinkable film.

There is also evidence that there is a criticality to the cascading water method, in that the evidence shows that the cascading water method results in a materially different product than the films referred to in SCHUT and Van der SANDEN et al, i.e., the cascading water method results in a film which exhibits substantial heat shrinkability at relatively low temperatures. Such films are recognized by those of skill in the art as being different from the blown films of SCHUT and Van der SANDEN et al.

With respect to VAN der SANDEN et al, Appellants note that this document also fails to make any teaching toward Appellants' heat-shrinkable films. Rather, the films disclosed in VAN der SANDEN et al are 50 micron *blown* films disclosed in the paragraph spanning the bottom of the first column of Page 155 and the top of the second column of this same page. These films are disclosed as being blown monolayer films which were back taped with polyester tape.

There are significant technical distinctions between blown films and Appellants' claimed heat-shrinkable films. Appellants' claims are clearly directed to heat-shrinkable films which are cooled by cascading water, thereafter heated to its softening temperature

and stretched in its machine and transverse directions followed by being quenched, so that the film will return to its unstretched dimensions when heated. Such films have different characteristics from blown films because they are produced by a process which is fundamentally different from the process used to make all blown films. That is, Appellants' claimed heat-shrinkable films are produced by orientation while the polymer is in the solid state, i.e., at the softening temperature of the polymer. Moreover, each of the pending independent claims recites the extrudate as being cooled to its solid state *by cascading water*. This can only be accomplished using the downward casting process, which is the process used in the commercial manufacture of films which are referred to in the art as "heat-shrinkable films". Polymers having low melt strength tend to fall apart in the downward casting process if they are not adequately supported. This is because a portion of film which is still molten must support the weight of a long column of plastic (both partially solidified as well as solid) during the downward casting process. This gravitational loading is not present in an upward blown process, i.e., the process by which the blown films of SCHUT and Van der SANDEN et al are made. Melt curtain support is not required in an upward blown process.

In contrast to such heat-shrinkable films, blown films are oriented while the polymer is molten. Thus, Appellants' claimed films are fundamentally different from the films described in both SCHUT and VAN der SANDEN et al. Those of skill in the art recognize that the melt strength of LLDPE and VLDPE and EVA used in the primary references are greater than the melt strength of the linear homogeneous ethylene/alpha-olefin copolymer, and as a result would not be led to use the teachings of SCHUT and Van der SANDEN et al as a reason to substitute the linear homogeneous polymer for the polymer used in

SCHOENBERG or EVERT et al or NEWSOME et al or MUELLER et al, in order to produce Appellants' claimed films. SCHUT, in teaching the low melt strength of the homogeneous copolymers, is teaching away from using homogeneous single site catalyzed copolymers to make Appellants' heat-shrinkable film.

The properties of the films disclosed in SCHUT and VAN der SANDEN are of blown films. These properties do not necessarily or inherently translate to heat-shrinkable films. There is no guidance as to whether the properties of a blown film, such as impact strength, will necessarily or inherently translate to a heat-shrinkable film. They may, or they may not. However, no certainty or guidance has been shown in the prior art. While the properties may or may not turn out to be similar, there is no certainty or guidance from the content of SCHUT or VAN der SANDEN as to whether those properties will turn out to be satisfactory or unsatisfactory. The homogeneous copolymers may or may not even be operable for the making of a heat-shrinkable film; performance is unknown and unpredictable.

For all of the above reasons, the various §103(a) rejections relying SCHOENBERG, EVERT, NEWSOME, and MUELLER, each in view of SCHUT and VAN der SANDEN, should be reversed, as no prima facie case of obviousness has been established. In addition to the above arguments, Appellants note that they have obtained unexpected results *in heat-shrinkable films quenched with cascading water*, using homogeneous linear single site catalyzed copolymers of ethylene and an alpha olefin having from six to ten carbon atoms. More particularly, Applicants direct attention to Page 22 lines 19-27 of their specification, which is as follows:

The oriented multilayer films of Examples 11-22 were tested for free shrink and instrumented impact with the results given below in Table IV. It may be seen that when

comparing the metallocene resin films of Examples 11 and 15 or 12 and 16 with the comparative example counterparts of 19 and 20, a substantial improvement in impact resistance is seen. Similarly, a comparison of Examples 13 and 17 or 14 and 18 with their respective comparative heterogeneous Examples 21 and 22 show an improved impact for the metallocene resins.

More particularly, the results in Table IV (Page 23, lines 1-16) show that the multilayer, heat-shrinkable films of Examples 11 and 15 have a peak impact strengths of 86.8 pounds and 77.4 pounds, respectively, while the heat-shrinkable films of corresponding comparative Examples 19 and 20 have peak impact strengths of only 54.2 pounds and 55.1 pounds. Comparing the average of the impact of Examples 11 and 15 (83.0 pounds) against the average of the impact strengths of comparative Examples 19 and 21 (54.65 pounds), one can see a 58% increase in impact strength. Similar results hold for a comparison of Examples 12 and 16 when compared against comparative Examples 19 and 20 (44.6% increase). It should be noted that this is a comparison of multilayer films all of which were: (a) exposed to the same level of irradiation (2MR), (b) all of which were oriented by trapped bubble method out of hot water at 195°F, and (c) all of which were 5 layer films with 4 identical layers and a fifth layer which contained an ethylene/alpha-olefin having a density of 0.902 g/cc (Examples 11), 0.905 g/cc (Examples 15, 19, and 21). Thus, the only significant difference in the films was the type of polymer, i.e., homogeneous versus heterogeneous. Appellants' multilayer heat-shrinkable films containing linear homogeneous copolymer exhibited an average impact strength more than 50% higher than Appellants' comparative heat-shrinkable films containing virtually identical heterogeneous copolymers. Appellants contend that this is evidence of unexpected result. Moreover, these

results were in Appellants' specification as filed, and was not produced after the Examiner rejected Appellants claims.

VAN der SANDEN et al makes no mention of the impact-resistant heat-shrinkable films of Appellants' invention. VAN der SANDEN et al has no teaching or suggestion that the new Exxon polymers can be used in a cascading water or downward cast process to produce heat-shrinkable films with impact strength more than 50 percent greater than was obtained using corresponding heterogeneous copolymers.

Appellants contend that until their invention, there was a substantial element of chemical unpredictability in whether a linear homogeneous ethylene/alpha-olefin copolymer could have been oriented in the typical downward casting (cascading water) commercial process used to make heat shrinkable films. Some polymers have enough wall strength for conversion to heat-shrinkable films by a downward casting process, while others do not have the requisite wall strength. Appellants have discovered that Exxon's metallocene catalyzed linear ethylene/alpha-olefin copolymers inherently lack adequate melt strength to undergo the downward casting process used in the commercial production of heat-shrinkable films. However, in order to obtain a heat-shrinkable film using the downward cast commercial process, the low melt strength of the linear homogeneous ethylene/alpha-olefin copolymer must be supplemented by other polymers in the film or made using a casting roll with orientation being carried out by tenter frame. Hence, some of Appellants' claims are directed to multilayer films, and films in which the linear homogeneous polymer is blended with another polymer, so that the additional polymer can provide additional melt strength so that a downwardly cast tape can be extruded, cooled, reheated to its softening temperature, oriented, and quenched.

As pointed out in the 15 November 1999 Amendment, the only actual films disclosed in VAN der SANDEN et al are the 50 micron *blown* films disclosed in the paragraph spanning the bottom of the first column of Page 155 and the top of the second column of this same page. As discussed in the personal interviews, blown films are not the same as Appellants' claimed heat-shrinkable films which are made by the cascading water (i.e., downward casting) process; blown films are made from a process which is different from heat-shrinkable films produced via cascading water, and different technical challenges are involved in these different processes. VAN der SANDEN et al also states:

Each converting method (film, extrusion coating, lamination) has its own processing requirements (melt strength, thermal stability, rheology) which must be satisfied to yield the economical production of the packaging structure.

Appellants point out that this statement is in support of their position that different processing requirements apply to different film production methods. Appellants also contend that this statement stands in support Appellants' position that melt strength is critical to the production of a heat-shrinkable film. That is, adequate melt strength must be satisfied in order to yield the economical production of the film. As Appellants have already noted, the melt strength requirements for making their recited heat-shrinkable film are different from the melt strength requirements to make a blown film.

In Paragraph 17 of the 7 September final Office Action the Examiner states that Appellants' increased shrink and increased impact arguments are not persuasive because the EXACT copolymers have a lower melting point and therefore will inherently provide a higher level of shrinkage because they can be oriented at a lower temperature. The Examiner further states that SCHUT discloses improved impact strength for the EXACT

copolymers. Appellants contend that this is an oversimplified view of their claimed invention. Shrink and impact properties in the resulting film depend upon the combination of polymers present, and the manner in which the film was made. Appellants have demonstrated that a simple change in orientation temperature can affect impact strength and shrink by a factor of two. One cannot predict, based on results with blown films containing linear homogeneous copolymer, the impact and strength results which will be obtained if the same polymer is used to make a heat-shrinkable film using the cascading water process. The process and resulting product are different. Appellants have discovered that linear homogeneous copolymer having a density of at least 0.902 g/cc can be used in the cascading water process to make a film having desirable shrink and impact properties. The combination of shrink and impact properties for such films was not predictable from the disclosure of impact in SCHUT or the disclosure of sealability in Van der SANDEN et al.

In summary, Appellants have pointed out that the various combinations of documents utilized in the various rejections do not establish a prima facie case of obviousness of the invention as claimed in the amended claims presented hereinabove. All of Appellants' claims recite the extrudate as being cooled by cascading water, which yields a film having different physical properties than those of the blown and cast films of SCHUT and Van der SANDEN. Moreover, SCHUT teaches low melt strength of EXACT® copolymers, which teaches away from using such polymers in a downward casting process. Teachings related to blown and cast films are not applicable to heat-shrinkable films made using a downward casting process. As a result, it is improper to combine SCHUT and Van der SANDEN with any of the primary references to render Appellants' claims obvious, in spite of the fact that SCHUT refers to multilayer cast or blown films and blends of

homogeneous copolymers in cast or blown films. Even if a prima facie case of obviousness has been made out (which is not the case), Appellants have pointed out their discovery of unexpected results: heat-shrinkable films made by the cascading water process, containing homogeneous single site catalyzed ethylene copolymers, have been discovered to provide higher impact strength relative to heterogeneous copolymers. This stands as yet another reason Applicants' claimed heat-shrinkable films are patentable over any one of the primary references in view of SCHUT and Van der SANDEN.

**(VII) CLAIMS 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, AND 56
ARE PATENTABLE OVER WILHOIT**

In Paragraph 11 of the 7 September final Office Action, Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 are rejected under 35 USC 103(a) as unpatentable over U.S. Patent No. 5,403,668, to Wilhoit ("WILHOIT"). The Office Action states that WILHOIT teaches blends of VLDPE, EVA, and a plastomer to produce heat-shrinkable single and multi-layer films oriented by double bubble biaxial orientation and irradiated, and that the homogeneous plastomer has a density of about 0.900 g/cc and a molecular weight distribution of less than 3, referring to the table on Column 5. The Office Action states that the plastomer resin would correspond with the linear homogeneous copolymer recited in the claims, and that the materials made by Mitsui using a single site vanadium catalyst have homogeneous properties. The Office Action goes on to state that VLDPE polymers are heterogeneous in nature, and that VLDPE has densities both less and greater than about 0.90 g/cc. Next, the Office Action states that the essential difference between the claims under examination and the teachings of WILHOIT is the specific use of homogeneous linear polymer having a density greater than about 0.901, and that the teachings of WILHOIT

overlap with the claimed ranges because the term “about” gives the claim enough latitude to overlap the value of the densities of the homogeneous copolymers of WILHOIT.

In response, Appellants maintain that Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 are patentable over WILHOIT. WILHOIT discloses various plastomers from Mitsui which are in fact linear homogeneous copolymers. However, these plastomers have a density which is, at most, up to 0.885 g/cc. Appellants’ claims, as amended above, recite a density of at least 0.902 g/cc, which the Mitsui polymers do not teach or suggest.

WILHOIT describes the nature of VLDPE resins in a table in Column 5. These resins are heterogeneous because they have a molecular weight distribution “above about 3”, and they have “at least two crystalline phases with the dominant phase having a melting point of between about 100°C and about 125°C”, which also describes heterogeneous resins. Moreover, the various resins identified as VLDPE resins in Table A in Column 6 of WILHOIT are known to be heterogeneous resins, not homogeneous resins. As such, with one exception (EXACT 3010C discussed immediately below), no VLDPE resins in WILHOIT are homogeneous resins.

WILHOIT also discloses a comparative example using EXACT 3010C homogeneous copolymer, which is the same Exxon homogeneous copolymer disclosed by RALPH. See WILHOIT at Column 15 line 60 through Column 16 line 9. However, WILHOIT discloses the results of a plaque test using the comparative blend incorporating the EXACT 3010C: the shrink values for all four plaques containing the TAFMER resin were all “superior” to the comparative which contained the EXACT 3010C. Thus, it appears that WILHOIT is teaching that the EXACT 3010C, having a density of 0.900 g/cc, produces shrink results *inferior* to those produced using TAFMER resins from Mitsui.

In addition to WILHOIT's teaching of the inferiority of EXACT 3010C for making a shrinkable plaque, Appellants again note that their claims recite a homogeneous single site catalyzed copolymer having a density of "at least 0.902 g/cc". As such, reference to the EXACT 3010C having a density of 0.900 g/cc in WILHOIT does not teach or suggest Appellants' recited homogeneous polymer in a shrink film. Since WILHOIT teaches inferior shrink from the EXACT 3010C, one of skill in the art, in order to increase the shrink, may think to lower the density to less than 0.900 g/cc, not to increase the density from 0.900 g/cc to at least 0.902 g/cc, i.e., the range recited in each of Appellants' independent claims, as amended hereinabove.

The disclosure in WILHOIT of the EXACT 3010C resin at 0.900 g/cc does not overlap "at least 0.902 g/cc" as recited in each of Appellants' claims. On this point, Appellants again call upon the arguments set forth under headings "(I)" and "(II)" above, regarding RALPH. Moreover, as there is no teaching, suggestion, or motivation to increase the density of the 0.900 g/cc EXACT 3010C of WILHOIT to a density of at least 0.902 g/cc, no prima facie case of obviousness has been made out by the Office Action. Appellants also rely upon the various corresponding arguments set forth above in response to the rejections based on RALPH. Accordingly, based on all of the arguments set forth above, Appellants contend that the rejection of Claims 1, 3, 4, 5, 6, 12, 14, 28, 35, 42, and 56 as obvious over WILHOIT should be reversed.

CONCLUSION

Based on all the arguments set forth above, Appellants respectfully request that the Board of Appeals reverse the rejection of Claims 1-8, 10-24, 26-43, 46-64.

Appellants respectfully request reconsideration of the patentability of Claims 1-8, 10-24,
26-43, 46-64, with a view towards allowance.

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Appendix

The claims on appeal are Claims 1-8, 10-24, 26-43, 46-56, and 61-64, as follows:

1. A heat shrinkable film comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to ten carbon atoms, said copolymer having a density of at least 0.902 g/cc, wherein said heat shrinkable film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its machine and transverse directions followed by being quenched, so that said heat shrinkable film will return to its unstretched dimensions when heated.
2. A heat shrinkable film as set forth in claim 1, wherein said homogeneous linear single site catalyzed copolymer is blended with at least one member selected from the group consisting of a thermoplastic homopolymer and a thermoplastic copolymer.
3. A heat shrinkable film as set forth in claim 2, wherein said thermoplastic copolymer of ethylene and an alpha-olefin has from three to ten carbon atoms.
4. A heat shrinkable film as set forth in claim 3, wherein said thermoplastic copolymer is heterogeneous, and has a density below about 0.90 g/cc.
5. A heat shrinkable film as set forth in claim 3, wherein said thermoplastic copolymer is heterogeneous, and has a density above about 0.90 g/cc.

6. A heat shrinkable film as set forth in claim 2, wherein said thermoplastic copolymer comprises a copolymer of ethylene and a second comonomer selected from the group consisting of vinyl acetate, alkyl acrylate, carbon monoxide, butadiene, styrene, acrylic acid, and a metal neutralized salt of an acrylic acid.

7. A heat shrinkable film as set forth in claim 2, wherein said thermoplastic homopolymer comprises a homopolymer of an alpha-olefin.

8. A heat shrinkable film as set forth in claim 1, wherein said homogeneous linear copolymer comprises a copolymer of ethylene and an alpha-olefin having from six to eight carbon atoms.

10. A heat shrinkable film as set forth in claim 8, wherein said homogeneous linear copolymer comprises a copolymer of ethylene and hexene.

11. A heat shrinkable film as set forth in claim 8, wherein said homogeneous linear copolymer comprises a copolymer of ethylene and octene.

12. A heat shrinkable film as set forth in claim 1, wherein said film is a multilayer film and said homogeneous copolymer is present in at least one layer of said multilayer film.

13. A heat shrinkable film as set forth in claim 12 , wherein said homogeneous copolymer is present in an outer layer.

14. A heat shrinkable film as set forth in claim 13 , wherein said outer layer is a heat sealing layer.

15. The heat shrinkable film as set forth in claim 1, wherein said homogeneous linear copolymer is present in an inner layer.

16. A heat shrinkable film having a symmetrical structure comprising:

outer layers comprising a propylene homopolymer or copolymer; and

a core layer comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to eight carbon atoms, said homogeneous copolymer having a density of at least 0.902 g/cc;

wherein said heat shrinkable film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its machine and transverse directions followed by being quenched, so that said heat shrinkable film will return to its unstretched dimensions when heated.

17. A heat shrinkable film as set forth in claim 16, wherein said propylene copolymer comprises a copolymer of from about 100 % to about 90 % by weight of propylene and from about 0 % to about 10 % by weight of ethylene.

18. A heat shrinkable multilayer film comprising:

a heat sealing layer;

an inner layer comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to eight carbon atoms, said copolymer having a density of at least 0.902 g/cc; and

a barrier layer; and

wherein said heat shrinkable film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its machine and transverse directions followed by being quenched, so that said heat shrinkable film will return to its unstretched dimensions when heated.

19. A heat shrinkable multilayer film as set forth in claim 18, wherein said barrier layer comprises a copolymer of vinylidene chloride and methyl acrylate.

20. A heat shrinkable multilayer film as set forth in claim 18, wherein said barrier layer comprises a copolymer of vinylidene chloride and vinyl chloride.

21. A heat shrinkable multilayer film as set forth in claim 18, wherein said barrier layer comprises an ethylene vinyl alcohol copolymer.

22. A heat shrinkable multilayer film as set forth in claim 18, wherein said barrier layer comprises a nylon.

23. A heat shrinkable multilayer film as set forth in claim 18, wherein said heat sealing layer comprises a copolymer of ethylene and a comonomer selected from the group consisting of vinyl acetate, alkyl acrylate, acrylic acid, and a metal neutralized salt of an acrylic acid.

24. A heat shrinkable multilayer film as set forth in claim 18, wherein said heat sealing layer comprises a heterogeneous copolymer of ethylene and an alpha-olefin having from three to ten carbon atoms.

26. A heat shrinkable multilayer film as set forth in claim 18 further comprising an additional layer which is an outer layer.

27. A heat shrinkable multilayer film as set forth in claim 18 further including at least one inner adhesive layer.

28. A heat shrinkable multilayer film comprising:

- a heat sealing layer comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to eight carbon atoms, said copolymer having a density of at least 0.902 g/cc; and
- a barrier layer; and

wherein said heat shrinkable film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its

machine and transverse directions followed by being quenched, so that said heat shrinkable film will return to its unstretched dimensions when heated.

29. A heat shrinkable multilayer film as set forth in claim 28, wherein said barrier layer comprises a copolymer of vinylidene chloride and methyl acrylate.

30. A heat shrinkable multilayer film as set forth in claim 28, wherein said barrier layer comprises a copolymer of vinylidene chloride and vinyl chloride.

31. A heat shrinkable multilayer film as set forth in claim 28, wherein said barrier layer comprises an ethylene vinyl alcohol copolymer.

32. A heat shrinkable multilayer film as set forth in claim 28, wherein said barrier layer comprises a nylon.

33. A heat shrinkable multilayer film as set forth in claim 28, further comprising an additional layer which is an outer layer.

34. A heat shrinkable multilayer film as set forth in claim 28, further including at least one inner adhesive layer.

35. A heat shrinkable film comprising at least two layers wherein at least one of said layers comprises a homogeneous linear single site catalyzed copolymer of ethylene and an

alpha-olefin having from six to eight carbon atoms, said copolymer having a density of at least 0.902 g/cc, and wherein at least one of said layers is crosslinked, and wherein said heat shrinkable film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its machine and transverse directions followed by being quenched, so that said heat shrinkable film will return to its unstretched dimensions when heated.

36. A heat shrinkable multilayer film having a symmetrical structure comprising:

outer layers comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to eight carbon atoms, said copolymer having a density of at least 0.902 g/cc; and
an inner core layer; and

wherein said heat shrinkable film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its machine and transverse directions followed by being quenched, so that said heat shrinkable film will return to its unstretched dimensions when heated.

37. A heat shrinkable multilayer film as set forth in claim 36, wherein said inner core layer comprises a copolymer of ethylene and at least one comonomer selected from the group consisting of vinyl acetate, alkyl acrylate, acrylic acid, and a metal neutralized salt of an acrylic acid.

38. A heat shrinkable multilayer film as set forth in claim 36, further including two identical inner layers immediately adjacent opposed surfaces of said inner core layer.

39. A heat shrinkable multilayer film as set forth in claim 38, wherein said inner layers comprise a heterogeneous copolymer of ethylene and an alpha-olefin having from three to ten carbon atoms.

40. A heat shrinkable multilayer film as set forth in claim 38, wherein said inner layers comprise a homogeneous single site catalyzed copolymer of ethylene and an alpha-olefin having from three to eight carbon atoms.

41. A heat shrinkable multilayer film as set forth in claim 36, wherein said outer layers further include at least one heterogeneous copolymer of ethylene and an alpha-olefin having from three to ten carbon atoms.

42. A seamless tubing comprising a multilayer, heat shrinkable film comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to ten carbon atoms, said copolymer having a density of at least 0.902 g/cc, wherein said film has been extruded and cooled to its solid state by cascading water, and thereafter heated to its softening temperature and stretched in its machine and transverse directions followed by being quenched, so that said film will return to its unstretched dimensions when heated.

43. A process for making a heat-shrinkable film, comprising:

- (A) extruding a film comprising a homogeneous linear single site catalyzed copolymer of ethylene and an alpha-olefin having from six to ten carbon atoms, said copolymer having a density of at least 0.902 g/cc; and
- B) cooling the film to the solid state by cascading water;
- C) reheating the film to a softening temperature of the homogeneous linear single site catalyzed copolymer;
- D) stretching the film so that an oriented molecular configuration is produced;
- E) quenching the film while substantially retaining its stretched dimensions to set the film in the oriented molecular configuration.

46. The process according to Claim 43, wherein the film is reheated to its orientation temperature range by hot water.

47. The process according to Claim 43, wherein the step of orienting by stretching is carried out using a trapped bubble.

48. The process according to Claim 43, wherein the step of orienting by stretching is carried out using a tenter frame.

49. The process according to Claim 43, wherein the film is oriented in both its machine direction and its transverse direction.

50. The process according to Claim 43, wherein the film is oriented at a temperature of from 83°C to 115°C.

51. The process according to Claim 43, wherein the film is oriented at a temperature of from 87°C to 99°C.

52. The process according to Claim 43, wherein the film is oriented at a temperature of from 91°C to 99°C.

53. The process according to Claim 43, further comprising irradiating the film after cooling the film to the solid state.

54. The process according to Claim 53, comprising irradiating the film after step E.

55. The process according to Claim 43, further comprising, between steps B and C, extrusion coating the film with a layer comprising at least one member selected from the group consisting of vinylidene chloride/vinyl chloride copolymer, vinylidene chloride/methyl acrylate copolymer, vinylidene chloride/ethyl acrylate copolymer, and vinylidene chloride/acrylonitrile copolymer.

56. The heat shrinkable film according to Claim 2, wherein said film is a multilayer film.

61. The heat shrinkable film according to Claim 1, wherein the multilayer film has at least 3 layers.

62. The heat shrinkable film according to Claim 61, wherein the homogeneous linear single site catalyzed copolymer is present in an inner layer.

63. The heat shrinkable film according to Claim 61, wherein the homogeneous linear single site catalyzed copolymer is present in an outer layer.

64. The heat-shrinkable film according to Claim 1, wherein the film has an impact strength of from 56 to 87 pounds.